

Application No. 09/871,823
Amendment dated: March 15, 2004
Reply to Office Action dated October 16, 2003

Amendments to the Claims:

This listing of claims will replace all prior version, and listings, of the claims in the application:

Listing of Claims:

1. (Currently Amended) A point-of-care blood measurement system for performing in-vitro diagnostic chemical analysis of a sample, comprising

a diagnostic card reader for receiving a raw [[analog]] sensory signal from a diagnostic card exposed to the sample and for providing an [[amplified]] analog sensory [[output]] signal directly related to the raw sensory signal, the raw sensory signal being dependent on a concentration of a chemical species in the sample,

a data acquisition [[unit]] circuit for converting the [[output]] analog sensory signal into a digital sensory signal; and

a general-purpose computer separate and distinct from the diagnostic card reader for receiving and analyzing the digital sensory signal and producing an analysis result output representative of the chemical species concentration in the sample.
2. (Original) The system of claim 1, wherein the diagnostic card reader is a smart-card reader and the diagnostic card is a modified smart card.

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3. (Currently Amended) The system of claim 1, wherein the diagnostic card reader includes amplification means for amplifying the raw [[analog]] sensory signal, and sensor multiplexing means for generating an output including secondary signals in addition to the raw sensory signal.
4. (Currently Amended) The system of claim 1, wherein the general-purpose computer is a portable computer and the data acquisition [[unit]] circuit is a [[PC or PCMCIA]] personal computer data acquisition card, or a personal computer memory card international association data acquisition card inserted into the computer.
5. (Original) The system of claim 1, wherein the general-purpose computer is a personal computer and the data acquisition [[unit]] circuit is a data acquisition card incorporated therein.
6. (Original) The system of claim 1, wherein the diagnostic card reader and the data acquisition [[unit]] circuit are incorporated in the same housing.
7. (Currently Amended) The system of claim 1, wherein the system includes [[including]] a plurality of diagnostic card readers and the data acquisition circuit is a data acquisition card

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[[is]] constructed for converting the respective analog sensory signal [[output signal]] of each one of the plurality of diagnostic card readers.

8. (Currently Amended) The system of claim [[7]] 1, wherein the system includes a plurality of diagnostic card readers and a [[including a plurality of]] data acquisition [[cards]] circuit for each diagnostic card reader [[, whereby]] and the [[single]] separate computer is connectable to all data acquisition [[cards]] circuits.

9. (Currently Amended) The system of claim 1, wherein the diagnostic card reader and the data acquisition [[unit]] circuit are distributed components of the system and the computer is a remotely located central component [[located remotely therefrom]], the system further including communication means for electrical or electronic communication of the digital signal to the computer.

10. (Currently Amended) The system of claim 1, wherein the conversion of the digital sensory signal into an analysis result output is carried out [[only]] in the general-purpose computer by way of a data-calculation software operating thereon.

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11. (Currently Amended) The system of claim 1, further including measurement control means for controlling measurement conditions in the diagnostic card, the measurement control means including heating means positioned in the diagnostic card reader for heating a diagnostic card inserted therein, and control software on the general-purpose computer for controlling operation of ~~[[operating]]~~ the heating means.

12. (Original) The system of claim 1, further comprising quality control means for monitoring the quality of the raw sensory signal, which quality control means is implemented as quality-control software running only on the computer.

13. (Currently Amended) The system of claim 11, wherein the computer is constructed for providing at least one digital control signal to the diagnostic card reader for controlling the operation of ~~[[operating]]~~ the heating means.

14. (Original) The system of claim 13, wherein the heating means in the card reader is constructed to heat a measurement region of a diagnostic card inserted therein.

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15. (Currently Amended) The system of claim 7, wherein the computer is constructed to provide a single clock signal to all diagnostic card-readers by way of the data acquisition [[card]] unit.

16. (Currently Amended) The system of claim 1, wherein the diagnostic card reader includes a means for generating an on/off signal to the data acquisition [[unit]] circuit and general-purpose computer.

17. (Currently Amended) The system of claim 16, wherein the means for generating the on/off signal is a mechanical switch in the diagnostic card reader which is normally in the off condition and is actuated upon insertion of a diagnostic card into the diagnostic card reader.

18. (Currently Amended) A point-of-care blood measurement system for performing in-vitro diagnostic chemical analysis of a sample, comprising

a diagnostic card reader for receiving a raw analog sensory signal from a single use blood diagnostic card exposed to the sample and for providing an analog output signal directly related to the raw sensory signal, the raw sensory signal being dependent on a concentration of a chemical species in the sample,

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sensor multiplexing means for generating a secondary output signal in addition to the analog sensory signal;

a data acquisition [[unit]] circuit for converting the amplified analog sensory [[output]] signal into a serial digital sensory signal [[and including amplification means for amplifying the raw analog sensory signal, and sensor multiplexing means for generating an output including sensory output signals in addition to the raw signal]]; and

a general-purpose computer separate and distinct from the diagnostic card reader for receiving and analyzing the digital sensory signal and the secondary output signal and for producing an analysis result output representative of the chemical species concentration in the sample, the computer having [[a serial]] an input port for connection to at least one data acquisition [[unit]] circuit.

19. (Currently Amended) A point-of-care blood measurement system for performing in-vitro diagnostic chemical analysis of a sample, comprising

a diagnostic card reader for receiving a raw analog sensory signal from a single use blood diagnostic card and for providing an analog sensory output signal directly related to the raw sensory signal, the raw sensory signal being dependent on a concentration of a chemical species in the sample, the diagnostic card and the card reader further including fluidics for control and/or supply of the sample fluid and other reagents or calibrants or other fluids required for the sensory analysis of the sample;

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amplification means for amplifying the analog sensory output signal and sensor multiplexing means for generating an output including signals in addition to the analog sensory output signal;

a data acquisition [[unit]] circuit for converting the analog sensory output signal into a serial digital sensory signal [[and including amplification means for amplifying the raw analog sensory signal, sensor multiplexing means for generating an output including signals in addition to the raw signal]], and a signal conversion [[means]] circuit for converting the [[analog output]] digital sensory signal of the [[card reader]] data acquisition circuit to a radio frequency digital signal; and

a general-purpose computer for receiving and analyzing the radio frequency digital signal and producing an analysis result output representative of the chemical species concentration in the sample, the computer having a radio frequency receiver module for receiving the radio frequency digital signal produced by the signal conversion means.

20. (Original) The system of claim 19, wherein the diagnostic card reader further includes a test circuit for quality control of the card reader and especially the interfacing thereof with the diagnostic card.

21. (Currently Amended) A card reader for use in a [[system as defined in claim 1]] point-of-care blood measurement system for performing in-vitro diagnostic chemical analysis of a

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sample, including a diagnostic card reader for receiving a raw sensory signal from a diagnostic card exposed to the sample and for providing an analog sensory signal directly related to the raw sensory signal, the raw sensory signal being dependent on a concentration of a chemical species in the sample, a data acquisition circuit for converting the amplified analog sensory signal into a digital sensory signal; and a general-purpose computer separate and distinct from the diagnostic card reader for receiving and analyzing the digital sensory signal and producing an analysis result output representative of the chemical species concentration in the sample, the card reader comprising

a housing;

a connector for engaging a diagnostic card and for receiving [[a]] the raw [[analog]] sensory signal from the diagnostic card[[, the raw sensory signal being dependent on a concentration of a chemical species in the sample]];

a signal conversion [[means]] circuit for converting the raw sensory signal received by the connector into a digital [[output]] sensory signal directly related to the raw sensory signal; and

a transmitter for wireless digital communication with [[a]] the general-purpose computer for receiving the digital sensory signal from the signal conversion circuit and transmitting the [[output]] digital sensory signal to the computer.

22. (Original) The card reader of claim 21, wherein the diagnostic card is a modified smart card.

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23. (Currently Amended) The card reader of claim 22, further including fluidics for control and/or supply to the diagnostic card of the sample fluid and other reagents or calibrants or other fluids required for the sensory analysis of the sample.

24. (Currently Amended) The card reader of claim 21, further comprising means for influencing the measurement conditions in a measuring region of an inserted diagnostic card, the means for influencing including a heating means for heating the measuring region and means for controlling the heating means, whereby the means for controlling is located on the computer and the transmitter is a two way transmitter for transmitting the [[output]] digital sensory signal to the computer and for receiving control signals from the computer for operation of the heating means.

25. (Currently Amended) The [[diagnostic card and]] card reader [[transmitter]] of claim 22, wherein the diagnostic card and card reader are constructed to perform an optical measurement of the sample.

26. (New) The system of claim 1, wherein the diagnostic card reader is constructed for receiving the raw analog signal from one of a number of different diagnostic cards each

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specific for a different chemical species in the sample, the raw analog sensory signal depending on a concentration of the respective different chemical species in the sample.

27. (New) A card reader for use in a point-of-care blood measurement system for performing in-vitro diagnostic chemical analysis of a sample, including a diagnostic card reader for receiving a raw sensory signal from a diagnostic card exposed to the sample and for generating a digital sensory signal directly related to the raw sensory signal, the raw sensory signal being dependent on a concentration of a chemical species in the sample; and a general-purpose computer separate and distinct from the diagnostic card reader for receiving and analyzing the digital sensory signal and producing an analysis result output representative of the chemical species concentration in the sample, the card reader comprising

a housing;

a connector for engaging a diagnostic card and receiving the raw sensory signal from the diagnostic card;

a signal conversion circuit for converting the raw sensory signal received by the connector into a digital sensory signal directly related to the raw sensory signal; and

a transmitter for communication with the general-purpose computer, the transmitter being constructed for receiving the digital sensory signal from the signal conversion circuit and producing a transmittable digital output signal for transmission to the computer.

28. (New) The card reader of claim 27, wherein the diagnostic card is a modified smart card.

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29. (New) The card reader of claim 28, further including fluidics for control and/or supply to the diagnostic card of the sample fluid and other reagents or calibrants or other fluids required for the sensory analysis of the sample.

30. (New) The card reader of claim 27, further comprising means for influencing the measurement conditions in a measuring region of an inserted diagnostic card, the means for influencing including a heating means for heating the measuring region and means for controlling the heating means, whereby the means for controlling is located on the computer and the transmitter is a two way transmitter for transmitting the digital sensory signal to the computer and for receiving control signals from the computer for operation of the heating means.

31. (New) The card reader of claim 27, wherein the diagnostic card and card reader are constructed to perform an optical measurement of the sample.